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THE NATION'S FIRE PROBLEM

Fire! Hundreds of thousands of times a year, that shout reverberates down hallways or the inner recesses of the mind as Americans come face to face with one of the most dreaded causes of death and disfigurement. Ironically, for every American who will confront flames or choking smoke this year, there are hundreds who give the threat of fire not a moment's thought, who will continue to take only the slightest precautions to guard against fire.

Fire is a major national problem. During the next hour there is a statistical likelihood that more than 300 destructive fires will rage somewhere in this Nation. When they are extinguished, more than $300,000 worth of property will have been ruined. At least one person will have died. Thirty-four will be injured, some of them crippled or disfigured for life.

Annually, fire claims nearly 12,000 lives in the United States. Among causes of accidental death, only motor vehicle accidents and falls rank higher, Most of fire's victims die by inhaling smoke or toxic gases well before the flames have reached them.

The scars and terrifying memories live on with the 300,000 Americans who are injured by fire every year. Of these, nearly 50,000 lie in hospitals for a period ranging from 6 weeks to 2 years. Many of them must return, over and over again, for plastic and reconstructive surgery. Many never resume normal lives.

The price of destructive fire in the United States amounts, by conservative estimate, to at least $11.4 billion a year (see Table 1-1) . Beyond calculation are the losses from businesses that must close and from jobs that are interrupted or destroyed.

In an America that has only lately grown conscious of its ecological responsibilities, there is a need also to develop an awareness of fire's role as one of the greatest wasters of our natural resources.

Appallingly, the richest and most technologically advanced nation in the world leads all the major industrialized countries in per capita deaths and property loss from fire. While differing reporting procedures make international comparisons unreliable, the fact that the United States reports a deaths-per-million-population rate nearly twice that of second-ranking Canada (57.1 versus 29.7) leaves little doubt that this nation leads the other industrialized nations in fire deaths per

capita. Similarly, in the category of economic loss per capita, the United States exceeds Canada by one-third.

Table 1-1. Estimated Annual U.S. Fire Costs

Property loss	$2,700,000,000
Fire department operations	2,500,000,000
Burn injury treatment	1,000,000,000
Operating cost of insurance industry	1,900,000,000
Productivity loss	3,300,000,000
Total	$11,400,000,000

Among those paying most heavily for this poor record are the Nation's firefighters. Theirs is the most hazardous profession of all. Their death rate is 15 percent greater than the next most dangerous occupations, mining and quarrying. In 1971, the injury rate for firefighters was 39.6 per 100 men-far higher than that of any other profession. That same year, 175 firefighters died in the line of duty; an additional 89 died of heart attacks and 26 are known to have died of lung disease contributed to by the routine smoke hazard of their occupation.

While many firefighters, particularly in smaller departments, do not have adequate opportunities for training, the fact is that the best training available does not obliterate the risks that firefighters must take in the line of duty. Every fire is a gamble with the unknown, a venture into a unique complex of combustible materials and fire dynamics.

Risk substitutes for certainty, intuition for firm knowledge. As the Committee on Fire Research of the National Research Council pointed out in 1959, "growth in our knowledge of how to cope with fire has not kept pace" with the growth of the fire problem. This basic force of nature has attracted little interest in the scientific community, and its elementary characteristics remain mysteries. To cite an unanswered practical question, posed in the Committee's 1969 report: "When should the top of a building be opened by firefighters to minimize spread; when does opening it increase the spread?" Every fire chief, of course, has to answer that question many times at many fire scenes, based on his training and experience. But little fundamental research has been performed to make one chief's answer better informed than another's.

America's poor fire record, and its failure to marshal enough scientific and monetary resources to improve the record, concerns those who work in the field of fire protection. Firefighters, individually and through such organizations as the International Association of Fire Fighters and the International Association of Fire Chiefs, have been outspoken on the need to improve fire protection. The insurance industry, fire equipment manufacturers, fire research scientists, code officials, government administrators : Each of these groups has sought to improve the Nation's performance in combating the fire problem. For three-quarters of a century, the National Fire Protection Association, representing a variety of interests, has compiled an excellent record in public education and in the setting of standards for fire safety.

Causes of America's Fire Problem

The efforts of individuals and organizations in the, fire protection field have run against the twin tides of ignorance and indifference-tides which contribute substantially to the extraordinary magnitude of the fire problem in the United States.

While genuine economic problems often stand in the way of deeper investment in fire protection, lack of understanding of fire's threat helps to account for the low priority given fire protection. And while those who have survived a fire never forget its destructive potential, for most Americans fire appears a remote danger that justifies indifference.

But indifference exists where it is least excusable. For example, there are those in the fire services who are unaware of the technological state-of-the-art in their field. There are fire department administrators who pay lip service to fire prevention and then do little to promote it. The public shares their unconcern, for in the public's image-an image which firefighters share-the fire department is a heroic-proportioned battalion of people rescuers and fire suppressers, not a professional corps of fire preventers.

Designers of buildings generally give minimal attention to fire safety in the buildings they design. They are content, as are their clients, to meet the minimal safety standards of the local building code. Often both assume that the codes provide completely adequate measures rather than mini-

The death rate from fire among children under five is three times that of the rest of the population.

ma1 ones. In other instances, building owners and occupants see fire as something which will never happen to them, as a risk they will tolerate because fire prevention measures can be costly, or as a risk adequately balanced by the provisions of a fire insurance policy. Product designers, too, give little thought to possible toxic or fire-aggravating effects should their products become involved in a fire.

The Federal Government also has been largely indifferent to the fire problem. The Federal programs that exist (some of which are excellent) touch only small portions of the total fire problem.

Lastly, the American public is indifferent to and ignorant of the heavy toll of destructive fire. The problem has not reached the American consciousness with the same force as, for example, the far less lethal problem of air pollution. In contrast, poliomyelitis, which in the peak year of 1952 killed about a third as many people as died by fire in that year, has been virtually eradicated because of the public attention it received. Moved by the sight of crippled children, Americans dug into their pockets to support research and control programs to attack the polio problem. Little concern has come forth regarding the grave losses to the Nation by fire.

Indifferent to fire as a national problem, Americans are similarly careless about fire as a personal threat. There is an old saying in the fire protection field, to the effect that fires have three causes: men, women, and children. It takes the careless or unwise action of a human being, in most cases, to begin a destructive fire. In their home environments, Americans live their daily lives amid flammable materials close to potential sources of ignition, Though Americans are aroused to issues of safety in consumer products, fire safety is not one of their prime concerns. Few private homes have fire extinguishers, much less fire detection systems. Too few multiple-family dwellings and institutions have automatic equipment for extinguishing fires. And often when fire strikes, ignorance of what to do leads to panic behavior and aggravation of the hazards, rather than to successful escape.

Fire accidents due to carelessness occupy a vast middle portion of the spectrum of man-caused fires. At one end of the spectrum are the fires that are caused by the relatively helpless in our society-the very young, the old, and the handicapped. At the other end of the spectrum' are the fires set deliberately.

The death rate from fire among children under 5 and the elderly over 65 is three times that of the rest of the population. Though together these young and old make up only 20 percent of the American population, they account for 45 percent of the fire deaths.

In contrast to the fire accidents difficult to prevent are the fires set on purpose. In 1971, among fires reported to the National Fire Protection Association, about 7 percent were classified as incendiary; an additional 17 percent were "of unknown origin." Arsonists pick expensive targets : Among the 1971 fires in which losses exceeded $250,000,27 percent were classified as incendiary, another 47 percent as of unknown origin. In many large cities, fire chiefs believe that almost half of all fires in their experience have been deliberately set.

Fire has always held an attraction for demented thrillseekers. That fire is a way of attacking authority is indicated by the fact that in 1971 26 percent of the large-loss school fires and 44 percent of the large-loss church fires were incendiary.

First cousin to the maliciously set fire is the false alarm. In large cities, it is not uncommon for false alarms to constitute 20 to 30 percent of all calls for service (excluding ambulance requests), In Boston false alarms in 1972 occurred on the average of one every 45 minutes.

Not all deliberately set fires stem from malice or thrillseeking; an increasing number are set for profit. A number of building owners have been setting their properties afire to reap insurance benefits and tax write-offs in excess of market value, delinquent taxes, or demolition costs. In the troubled city of Newark, N.J., where the number of vacated buildings increased by 300 percent between 1965 and 1971, the number of fires in these structures increased by over 500 percent. There is evidence that the Fair Access to Insurance Requirements (FAIR) plan, designed to provide insurance on properties not qualified under normal company standards, is being used by some owners of deteriorating buildings to burn for profit.

Social Changes Affecting the Fire Problem

That there is not an all-out war against arson and false alarm again reflects national indifference toward destructive fire. Partly because of this national indifference, and partly because rapid changes in American society have created other problems, our approaches to 'the fire problem are not adequate to meet the needs of today. They suffer what anthropologists call "cultural lag"; our methods of handling the fire problem are attuned to the America of yesteryear-not to contemporary needs, much less to future needs. They have changed slowly, while America has been changing rapidly.

It doer; not follow that the increasing lag has led to increasingly inadequate fire protection. For, as the National Fire Protection Association has documented, our Nation's dollar losses from fire (adjusted for inflation) have not worsened materially over the years. The percentage of national wealth destroyed by fire has actually been decreasing by a very small extent. What follows is that, if the Nation's fire record is to improve significantly, our methods of protection against fire losses must respond, more effectively than they have thus far, to important changes that have been taking place in America.

One such trend is the increasing urbanization of the United States. Half a century ago, about half our population lived in urban areas. Today, about three out of four Americans do. While distances from firehouse to fire site are generally shorter in urban areas than in rural areas, clogged city streets often add costly minutes to response time when a fire breaks out. Intensive use of land in urban areas means bigger buildings, which create complex problems of fire safety. More people are concentrated and exposed to the threat of fire or its toxic smoke. High-rise buildings, though hallmarks of urban progress, are special nightmares to firefighters. Upper floors are hard to reach, and it is difficult to vent heat and smoke in modern air-conditioned buildings.

Urbanization has created social problems-the migration of the poor into cities, the expansion of ghettos, the rising expectations of minorities which are being met only laggardly---that have affected the magnitude of fire losses. The most rundown neighborhoods, where dilapidated buildings are tinder boxes, are where the poor are forced to live.

The crowded apartment houses and tenement buildings often reflect total indifference to fire safety, because landlords see no benefit in decent, long-term upkeep of their properties. Tenants must often warm their rooms with dangerous portable or make-shift heaters because central heating is inoperable or nonexistent, Discontent in the ghettos can breed problems for fire departments: in the form of riots, set fires, false alarms, and harassment of firefighters.

The movement of America's minorities for recognition of their rights has forced upon us the realization that fire departments are, in general, manned disproportionately by white Americans. Racial minorities are under-represented in the fire departments in nearly every community in which they live.

Another social change pertinent to the Nation's fire protection is the increased militancy of municipal employees. Firefighters have seen what unionization has done for the salaries and benefits of other city employees. They have seen conditions improve for other municipal departments while they have been bypassed. Quite understandably they have petitioned for higher wages and better working conditions. In the past half-dozen years, in some of the larger cities, they have also undertaken job actions-slowdowns, massive sick leaves, and even a few strikes-which jeopardized fire protection for the community.

The increasing militancy of firefighters meets, head on, another important change: the increasing financial plight of local governments. Especially in the large cities, but not exclusively there, governments are facing static or declining tax revenues, increasing costs, and hence the need to question all city expenditures and to place greater emphasis on the efficient operation of municipal services. Local governments are demanding better long-range planning and better utilization of manpower and equipment. They are pressing fire. departments to produce sophisticated cost-benefit justifications for their expenditures. They are demanding that fire departments operate more efficiently without jeopardizing the public's safety from fire.

This makes pertinent a further trend in our society: the increasing application of management science to solve these local problems. Local governments are calling in research experts to re-

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Working amid flame, smoke, and collapsing buildings, firefighters pursue the most hazardous profession of all.

view municipal services with the same systems approaches that have worked so well in industry.

Still another important change bearing on the Nation's fire protection is the so-called technological revolution. Our man-made environment is being filled with new materials and new products about which little is known concerning their hazard potential when they burn. New chemicals and other hazardous materials are being produced, shipped, and used around the country. Often fire departments are unaware of these dangers in their midst, nor have they experience in dealing with them. Some of these new products produce toxic gases while burning that are far more deadly than the kinds of smoke firefighters are accustomed to.

About the technological revolution it can also be said that it has hardly touched the fire services. In comparison with such fields as aviation, large-scale construction, and electronics, the technology of firefighting has been relatively stagnant. Ironically, while flammability standards have been imposed on children's sleepwear, no such standards exist for firefighters' "turnout" coats.

Prevention Needs Priority

Response to important social changes is a key to improving the Nation's record in fire protection. A consideration of equal importance is the need to change priorities in the field of fire protection. Currently, about 95 cents of every dollar spent on the fire services is used to extinguish fires; only about 5 cents is spent on efforts-mostly fire prevention inspections and public education programs-to prevent fires from starting. Much more energy and funds need to be devoted to fire prevention, which could yield huge payoffs in lives and property saved. (While fire prevention efforts would lower the incidence of fire and, hence, might lower the costs of fire suppression, it would be essential to support fire suppression services at current levels until a marked reduction in fires had been documented.)

The Role of This Commission

The National Commission on Fire Prevention and Control was funded by Congress in 1971 to study the fire problem and make recommendations "whereby the Nation can reduce the destruction of life and property caused by fire in cities, suburbs, communities, and elsewhere."

The enabling legislation (see Appendix I), without limiting the Commission's scope, defined a number of areas for our study. We rephrase them here as questions: What technological advances, construction techniques, and improved inspection procedures would prevent fires most effectively? Is the Federal Government doing all it should to lessen the danger of destructive fires in federally assisted housing and in the redevelopment of the Nation's cities and communities? Are existing methods for suppressing fires adequate? Are the procedures for recruiting personnel adequate? Are firefighters receiving sufficient training? Are current fire communication techniques adequate? Does firefighting equipment need improvement? Standardization? Are there administrative problems affecting the efficiency or capabilities of fire departments? Finally, how should responsibilities for reducing fire losses be distributed among Federal, State, and local governments?

In pursuit of answers, the Commission has held hearings in five widely scattered cities, heard the testimony of more than 100 witnesses filling thousands of pages of transcript, and spent countless hours learning and deliberating in both formal and informal sessions. In addition, special studies have been prepared by Commission staff and by a dozen experts from government and private groups exploring particular problems and their alternative solutions. Over 130 position papers were filed with the Commission advocating different approaches to the fire problem.

How Fire Safe Could We Be?

Congress established this Commission out of a conviction that- present rates of losses in life and property by fire in the United States need to be reduced. The question naturally arises: What level of losses is acceptable? For us to set as a goal a total end of destruction of life and property by fire would be unrealistic.

An acceptable goal, however, can be based on the allocation of an appropriate part of our national resources. The goal of saving lives, of course, is inherently worthy of pursuit. But one way of defining a minimal appropriate level of Government investment is to find that level which will maximize the payoff, in tax revenues, from

In some large cities, nearly a third of the engine responses are to false alarms-not always set by children

both lives and property saved. Another is to compare the severity of the fire problem relative to other important problems competing for resources, such as crime and death on the highway.

This Commission believes that a reduction of 50 percent in deaths, injuries, and property losses is quite possible within the next generation. This can be attained by a declining balance reduction of 5 percent per year. To that end, we have recommended a number of actions that can be taken by government and industry at little or no cost. But we also see the necessity, if that goal is to be achieved, of Federal assistance averaging $150 million annually over the next 5 years.

This 5 percent drop per year in fire losses over the next 5 years could accomplish :

- A total saving of 8,000 lives;
- A total reduction of injuries by 210,000;
- Property losses saved totaling $1.9 billion;
- Hospital and medical costs lowered by $85 million. (Under the present system of subsidized medical care, this might save the Federal Government $30 million.)

Federal Action is Needed

While the Commission's stated goals for fire reduction might be argued, it is indisputable that the Federal Government must at *some* cost help the Nation attack the fire problem if any significant reduction in fire losses is to be achieved. It must help devise educational programs so that Americans can prevent fires and cope with them

when they occur. It must help provide better training and equipment for firefighters. It must assist an accelerated and coordinated effort in research on the fire problem.

Accordingly, **the Commission recommends that Congress establish a United States Fire Administration to provide a national focus for the Nation's fire problem and to promote a comprehensive program with adequate funding to reduce life and property loss from fire.**

Details of the responsibilities we envision for the U.S. Fire Administration, and of its relations to existing Federal agencies, will emerge in subsequent recommendations. It is sufficient to say here that we would not want the proposed U.S. Fire Administration to swallow or supplant ongoing programs of research and action. The function of the Administration would be to help guide efforts, by keeping local, State, and Federal agencies informed of related efforts in both the private and public sector, encouraging cooperation, and promoting interest in areas of research or action that have been neglected.

Many of our recommendations call for augmented programs and new efforts by State and local governments. We recognize that many of these governments are unable to undertake new expenditures in fire protection without Federal help. Thus we envision the new Fire Administration as also being a grant-making agency in the field of fire protection, similar in concept to the Law Enforcement Assistance Administration.

The Need for Fire Data

One other function of the proposed U.S. Fire Administration deserves special emphasis : to help place solutions to the fire problem on a firmer foundation of scientific data.

Time and again-in listening to testimony, in studying the fire problem, in searching for solutions-this Commission found an appalling gap in data and information that effectively separated us from sure knowledge of various aspects of the fire problem. The lack was not total; the National Fire Protection Association, for example, collects valuable data on a voluntary basis from the fire services. Other valuable studies have been conducted by the National Bureau of Standards, the Committee on Fire Research of the National Research Council, and a number of insurance companies. But in many areas of the fire problem, proposed solutions rest on limited experience, shaky assumptions, and guesswork,

Cost-effective solutions to the fire problem will require a lot more data-broader in scope and deeper in detail than now exist. This is not a one-time need. Continuing data collection will be needed to measure the effectiveness and impact of new programs in fire protection and to identify emerging problems in the field.

Accordingly, **the Commission recommends that a national fire data system be established to provide a continuing review and analysis of the entire fire problem.** In addition to filling in current gaps in understanding of the fire problem, the system could ensure against duplication of effort by data-gatherers in both the public and private sectors. (In this connection we note that the National Fire Protection Association has developed the most broad-based and thorough data system; it would be appropriate for the Government to utilize the NFPA surveys as part of its larger effort in data-gathering.) Since the proposed U.S. Fire Administration could not perform its functions effectively without adequate data, it is altogether logical to house responsibility for administering a national fire data system within that Administration.